HOW EXCHANGE RATE AFFECT EMPLOYMENT IN EXPORT ORIENTED AND IMPORT COMPETING COUNTRIES IN ASIA?

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CERTIFICATE

This is to certify that this thesis entitled: **"How exchange rate affect employment in export oriented and import competing countries in Asia"** submitted by Ms. Salva Aslam is accepted in its present form by the Department of Economics & Econometrics, Pakistan Institute of Development Economics (PIDE), Islamabad as satisfying the requirements for partial fulfillment of the degree of **Master of Philosophy in Economics**.

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ABSTRACT

Previous literature focus on relation between exchange rate and employment. The purpose of this study is to investigate the relation using trade ratios at macro level data and cross-country comparison has done based on import competing (Pakistan, India) and export-oriented countries (Japan, China). This study practices the sample of four countries (Japan, China, Pakistan and India) over the period of 1990-2014 using ARDL technique. The results from Bound test shows that long run relationship exist between exchange rate and employment. The econometric analysis suggests a negative relationship between exchange rate and employment. All the variables except GDP and world interest rate are significant for all the four countries and these two variables don't affect employment in the long run. The results indicate that Export Oriented Countries Japan and China show positive sign of trade ratios which mean the effect of devaluation of exchange rate is positive on employment and this positive sign show high openness of these countries. While the Import oriented countries Pakistan and India show negative sign which indicate low openness.

DECLARATION

I, Salva Aslam d/o Muhammad Aslam, declare solemnly that this thesis has been authored by me for the fulfillment of requirement of M.Phil. degree from PIDE. This dissertation is the result of my own effort and use of resources quoted in the thesis explicitly. Any item copied from the internet or any other written source used has been quoted with reference to the source of citation.

Salva Aslam d/o Muhammad Aslam

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Chapter 1

INTRODUCTION

Unemployment is the cause of poverty and is one of the serious problems worldwide. The level of unemployment has been increasing over a period and goes up during the period of recession. According to the International Labor Organization 172 million people were counted as unemployed in 2018 and the rate of unemployment was 5%. This number has expected to increase by 1 Million per year and reach to 174 Million till 2020. There are four main reasons of unemployment these are increased population, rapid technological change, lack of education or skills for employment and raising cost of doing business. Unemployment lead to generate financial problems which reduces the purchasing capacity and minimized standard of living. Social problem are also a byproduct of unemployment because it's not just reduces the national income but also increase inequality and people who are unemployed for a longer period of time suffer a skill loss to increase the rate of drug usage, suicide ratios, discrimination in society and domestic violence (Garry and Thompson 1996). Further it has proved that unemployment for longer period can decrease life expectancy by 7 years.

Among different causes of unemployment cost of doing business is the top cause of unemployment, because most of the developing countries are dependent on imported inputs to use in their production process. If the cost of imported input increases, it increases the production cost and hurt employment level. Trade plays a vital role in formulation of foreign reserve and engaging labors in the process of producing exports. Many countries especially Asian countries are facing problem of balance of payment, and to solve the problem of balance of payment deficit they go for different exchange rate policies such as the devaluation policy. Instability of exchange rate negatively affect the economy, because it discourages the investors to do less investment in that

country and employment in that sense decreases. So, exchange rate is an important determinant of country's trade balance, capital flows, investment and employment level, because fluctuation in exchange rate affected the country's imports and exports. The countries where import share is higher, decline in prices of imports or appreciation of a currency hurt domestic labor market (Revenga 1992). If the currency of a country depreciates then the demands of its imports decreases because imports become expensive and this may lead to flourish domestic industry, factories will be expanded and more labor force will be employed and get jobs. On the other hand, decrease in the price of exports increase the demand of exports, this will increase the capacity of a country to produce more and become source of employment generation. While appreciation of a currency lowers the job creation and causes higher unemployment (Kim 2005). Exchange rate also affects the labor force of manufacturing sector, because vital role is played by manufacturing sector in the economy. However nonmanufacturing industries are also affected by exchange rate even though they have little access to international market. The channel how it works is that in case of devaluation of currency demand for manufacturing industries increases, so demand for nonmanufacturing sector also increases which generate employment (Haung and Tang 2015).

In literature many studies have answered the question that employment level may reduce in response to movement in exchange rate. They include trade ratios as transmission channel to analyze the impact of exchange rate on labor market at firm level data and focus on developing and developed countries in this regard. Klein and Triest (2000) include openness as the transmission channel of exchange rate fluctuation on employment. Campa and Goldberg (2001) include openness as well as trade ratios in analyzing the effect of exchange rate on employment. Accordingly, the channel through which exchange rate volatility effect the employment can be explained as, in case of depreciation the input cost increases, which increases the cost of production

of final goods, so the revenue of the firm decreases which lowers the employment level. However, the other side of the story is devaluation leads to rise in exports which leads to domestic increase in production and increase in labor input. If prices of local currency are stable labor sensitivity is higher in response to currency shocks. Market structure plays its role to analyze the impact of exchange rate pass through into exports in term of foreign currency. The effect of pass through is more prominent when products are differentiated, low substitution of product in foreign market; hence exporter has more market power if he faces less competition in foreign market. The second shows the responsiveness of demand to change in price, due to depreciation export prices reduces in foreign currency, supply of exports increase in foreign market which positively affects the price elasticity of demand. Characterizing three important feature that is relevant for determining labor input through exchange rate. First thing is that if total demand of a country is based on imported product, so the local producers are affected by the competition due to dependence on imported product and from movement on exchange rate. Second thing is the substitutability of the imported product, if there is no substitutability of imported input than exchange rate fluctuation effects the employment level. Third thing is that the change in employment level due to fluctuation in exchange rate depends upon distribution of workers. (Nucci and Pozozolo 2009).

The goal of this study is to evaluate how exchange rate affect the labor market in import dependent and export-oriented countries of Asia including, Pakistan, India, China and Japan.

1.1 Problem Statement

As there are many determinants of employment, movement in exchange rate may also affect the employment indirectly. Most of the developing countries have increased their value of imports in recent year including Pakistan where imports have increased annually 5.1% from 2012 to 2017. Major imports of Pakistan are refined and crude petroleum. India has also been facing a

trade deficit from last 15 years; in 2017 India had a trade deficit of $125Billion. Major imports of India are crude petroleum, gold coal, and diamond. China become the biggest export-oriented economy of the world; they have positive trade balance of $873Billion. From 2012 to 2017 there is 2.5% annual increase in China's exports; its major exports are broadcasting equipment. Like China, Japan is the second largest exporter in Asia and had a positive balance of trade of $62.4Billion in 2017. Major exports of Japan are cars, vehicle parts and machinery (oec.world). The average rate of unemployment in Asian countries from 1990 to 2017 i.e Pakistan has 5.47%, India has 5.16%, China has 4.07%, and Japan has unemployment rate 2.7% (Global Economy). Countries show different response of employment due to change in exchange rate because some countries increase their revenue through exports, and some depend on imports to fulfill their needs. Exchange rate movement create uncertainty in profits which affect production process, so elasticity of labor depends upon openness. The import dependent countries (Pakistan, India) have trade deficit and high unemployment rate while export oriented countries (China, Japan) have positive trade balance and low unemployment rate. Which shows that exchange rate movement effect the trade ratios and employment level.

1.2 Research Question

What is the elasticity of labor demand in response to change in exchange rate in countries with high import penetration, export orientation and imported input ratio?

1.3 Research Objective

Find out the employment elasticity of exchange rate in countries depend on export orientation, import penetration and imported input ratio.

1.4 Significance of the Study

This study will help to find how exchange rate movement effect the trade ratios in Asian countries and how employment respond to these movement in export oriented and import competing countries, which is important to check the way to development. It gives a policy suggestion about exchange rate to encourage investment and exports, because some countries intentionally devalue their currency to increase exports and production which effect employment level. And the countries whose major imports are based on raw material, exchange rate appreciation or depreciation ultimately effect the production process and employment level in that countries.

1.5 Organization of study

The study has been divided into four different chapters. First is the introduction of the topic i.e. How exchange rate affect employment in export oriented and import competing countries in Asia. Literature review constitutes the second chapter. After that is the third chapter covering the Data and Methodology in which collection of required data, proxies to be used and the most appropriate methodology employed in order to get the accurate results will be discussed. The forth chapter demonstrates empirical results of the current study. The last chapter is about conclusion and policy recommendation.

Chapter 2

Literature review

Unemployment is a situation where people are searching for jobs and remained un-hired. The problem became severe with the passage of time specially after Global financial crisis. As there are many factors which affect employment level, exchange rate is one of the reasons. There are different channels through which variation in exchange rate affect employment level. Exchange rate and employment are two major macroeconomic variables for which many articles on international level taken under consideration. In many studies some of the researchers found that they have negative relationship between them and some of them show positive. Many countries face the problem of deficit in their balance of payments due to volatile nature of both variables. In an article there was a study on ten Asian countries to check the impacts of both macroeconomic variables. It has been observed that exchange rate has very positive and significant impact on the employment rate of a country. Labor market suffered allot from it and it should be necessary to maintain an exchange rate of country for long terms to remove the problem of unemployment.

Branson and Love (1988) studied the relationship between exchange rate and labor market in US and Japan, the results show that 1 million jobs were lost due to appreciation of dollar in manufacturing goods sector, however agricultural and non-tradable sector were not included. Revenga (1992) has examined the impact of exchange rate on manufacturing sector labor force from 1977 to 1981 in US and concluded that overvaluation of currency reduces employment level, particularly in industries where competition is more in import sectors. Burgess and Knetter (1998) investigated the impact of exchange rate on manufacturing level employment. According to them elasticity of exchange rate to employment depend upon the market structure, labor market and

parameters of international trade. If industry has more market power, then employment level will be less affected by the exchange rate movement. Gourinchas (1999) examined the impact of exchange rate on employment on inter and intra sector job reallocation. They investigate that the movement in real exchange rate effect the job creation and destruction in France. They concluded that trade sector industries are more responsive to exchange rate movement, and job creation is more unstable than job destruction. Campa and Goldberg (2001) examine the relation between exchange rate, employment, wages and over time activity in U.S manufacturing industries. Exchange rate has significant impact on wages in industries where there is low price over cost markup ratio. Industries with less skilled labor force and low price over cost markup ratio show larger employment elasticity to exchange rate. While analyzing the effect of exchange rate on employment trade ratios and imported input are considered to be an important factor to be included.

Belke and Gros (2002) examine the impact of exchange rate instability on labor market of central and eastern European countries. Annual data is used from 1991 to 2001. From simple scatter diagram it shows that Volatility nature of exchange rate and unemployment has positive relationship. Exchange rate movement is the cause of high cost for labor market in form of lower employment level. Faria and Ledesma (2004) analyzed that there is a negative relationship between exchange rate and employment, so the currency devaluation increases the employment in US. Kim and Kinal (2004) examined the link between exchange rate and employment in korea, Philippine and Malaysia by taking data of 28 industries. They concluded that unemployment effected positively to exchange rate shocks. Filiztekin (2004) investigated the impact of exchange rate on industrial employment in turkey and concluded that the net effect of depreciation was negative on employment and wages, however the effects were more significant on wages . Ahmed and Hyder (2005) shows that how the exchange rate effect an economy and its different aspects.

By using VAR model on the yearly data of 1977 to 2005 they investigate that fixed exchange rate is not in the favor of Pakistan's economy. By all results it is concluded that Flexible exchange rate will help to steady the external inequity of macroeconomic variables but there is an argument arise from results that show that exchange rate devaluation have significant negative impact on domestic demand which more than counterbalance the positive impact of net exports. Thus, greater flexibility of exchange rate may destabilize relatively stabilizing output growth. Hatemi and Manuchehr (2006) examine the long run relation at firm level between real exchange rate and unemployment in france. They used unit root panel and co-integration panel technique and analyzed that employment at firm level is very sensitive due to movement in exchange rate. Galindo et al. (2007) test the impact of exchange rate fluctuation on employment. This impact depends upon liability dollarization and trade openness. Econometric results show that depreciation of a currency positively affect the employment, but in case of increase in liability dollarization effect is opposite. Hua (2007) studied the channel through which exchange rate effect the employment level. The currency appreciation negatively affects the employment of manufacturing industries by three channels: 1) by decreasing exports 2) by technological change and 3) efficiency channel. These three channels have statistically significant impact on employment.

Nucci and Pozollo (2010) show in their study that exchange rate has profound bang on the employment at average level. The response of job to currency swings depend on firm's exposure to foreign sales and their reliance on imported input. They examined that job reallocation within the firms is much affected by any movement in exchange rate and the job creation is more sensitive than the job termination. Caglayan and Torres (2010) focus export and imports emplacement and show that exchange rate has negative impact on investment and unemployment for Mexican firms

whereas contrariwise for import oriented firms. Alam and Ahmed (2010) examined result of exchange rate instability on Pakistan import with its foremost trade associate countries from 1982 to 2008. The study shows that factual exchange rate has never increases export of Pakistan in long run and volatility of real depreciation has not decreased demand for import in Pakistan which means that demand for imports is inelastic to real depreciation of exchange rate and its volatility. It concludes that policy makers should make different policies according to the relationship of trading partners with Pakistan. Chang and Sheen (2011) investigates for the Taiwan Singapore and South Korea that exchange rate and unemployment has positive relationship. Pattichise et al. (2011) assessed that exchange rate uncertainly negatively affect the imports of a country, so the firms who are importing feel hesitate to invest in the country , so less investment leads to create unemployment. Feldmann (2011) collected the data of 17 industrial countries from 1982 to 2003 and controlled the effect of all other variables to verify the shock of exchange rate uncertainty on unemployment level the result showed that the magnitude was small however impact was there. Zeng at el. (2011) examine the effect of foreign trade and exchange rate on employment. According to the study exchange rate policy is more effective than Monetary and fiscal policy in employment promotion. Chimnanie (2016) collected data of Asian countries from 1995 to 2005 and estimated the exchange rate effect on unemployment. The results of the study indicate that in Asian countries exchange rate uncertainty had significant and positive impact on unemployment.

Italo Colantone (2012) examines the impact of actual exchange rate on job allocation in Belgium by using data from 1996 to 2002. He found that real change in exchange rate contain a major influence on job flow. His empirical study also shows that increasing trend towards job destruction may relocate the high wage and old workers whereas a decreasing trend toward job creation may slow down the gathering of human capital. Nyahokwe and Ncwadi (2013) in South

Korea estimated the influence of exchange rate improbability on unemployment level, and conclusion was very interesting and showed that as many other factors that affect the employment but a larger proportion of change in employment is due to exchange rate uncertainty. Macedoni and Sdogati (2013) investigates that depreciation of one's country currency may result in transferring the production of import-oriented goods to that country. Results shows that some countries which have high productive growth can specialize only by handling the exchange rate with the currency of medium fruitful countries. The readjustment of the low productivity country currency will not change the production structure of high productive country although it may raise the share of goods produced in the medium productivity country. Haung at el. (2014) Investigates that how the exchange rate effect the employment rate of Canada. The results conclude that appreciation of a Canadian dollar has substantial impact on employment in manufacturing industries which are mainly linked with export-weighted exchange rate rather than the Import weighted and because this sector contains only 10% of employment while the exchange rate has small impact on non-manufacturing industries. Bhorat at el. (2014) studied the relation between exchange rate and Sectoral employment from 1975-2009 in South Africa. This study focusses on how behavior of exchange rate effect the employment of non-agriculture sector. Econometric evidence suggest that currency appreciation has a negative effect on tradable sector employment, while the effect was insignificant on non-tradable sectors.

Yokoyama at el. (2015) examine the impact of exchange rate on segmented labor market of Japan. The conclusion from the firm level panel data indicates that appreciation of a currency negatively affects the employment of exporting firms. Permanent exchange rate more effect the regular employment as compare to non-regular. Mpofu (2015) investigate the effect of exchange rate fluctuation on manufacturing sector employment. To examine the relation between exchange

rate fluctuation and employment ARDL has been used. The results of this study indicate that wages, output, interest rate and exchange rate has significant impact on employment of manufacturing sector. Palaez and Sierra (2016) examined the impact of exchange rate on industrial sector employment of Colombia by using data of 59 industries from 2000-2010. The results indicate that real appreciation of a currency had a negative effect on employment of 18 industries and positive effect in seven. Haung and Tang (2016) estimate the impact of exchange rate on employment of major industrial cities in U.S. The results indicate that deprecation of a currency directly affect the employment of manufacturing sector, and its indirectly effect the employment of local non-manufacturing sector. However, this indirect effect is 60% large and more significant than direct effect. Jaffri at el. (2016) examine the impact of real effective exchange rate on unemployment from 1991 to 2015 in Pakistan. To find out long run relation among variable ARDL technique has been used. The findings of this paper show that exchange rate appreciation negatively affect the unemployment while GDP growth doesn't affect unemployment in Pakistan Ay and Ayhan (2016) examine the impact of exchange rate fluctuation on employment in Turkey from 2003 to 2014. In order to analyze the short run and long run behavior of coefficients ARDL technique has been used. Econometric evidence supports the theory that employment is negatively affected by exchange rate fluctuation.

Literature Gap

Until now, several studies have been conducted to investigate the response of employment level due to change in exchange rate. In literature trade ratios have been included as transmission channel to analyze the impact of exchange rate on labor market at firm level data. Previous studies focus on developing and developed countries due to difference in their characteristics. Therefore,

the purpose of this study is to investigate the relation using trade ratios at macro level data and cross-country comparison has done on the basis of import competing and export oriented countries

Chapter 3

Data and Methodology

This chapter specifies the model for the empirical investigation. It discusses the sample, the data sources, variables and econometric model that will be used in this study.

3.1 Theoretical framework:

Labor demand is derived by Campa and Goldberg (2001) by solving profit maximizing problem. Labor demand is effected by change in exchange rate in sense that it may affect the foreign and domestic sales and cost of imported input used in production, which ultimately affect the marginal revenue product of labor. Labor demand is more sensitive in industries where producers have little ability to pass through exchange rate shocks into prices (Campa and Goldberg 2001). Optimization is obtained under constraints in production structure such as product demand and adjustment in labor cost. Cob-Douglas production function is assumed to be used for simplicity. Firm faces shocks through three potential sources: domestic demand, foreign demand and exchange rate. Domestic product demand is assumed to be increasing function of exchange rate and aggregate demand, and foreign product demand is assumed to be increasing function of exchange rate and aggregate demand. Demand of product is influence by exchange rate through shift in prices of home product as compare to foreign competitor (Kim 2005). Firm faces shocks through 3 potential sources: domestic demand, foreign demand and exchange rate. It is assumed that adjustment incurred in cost of labor input is quadratic. Change in labor demand due to change in exchange rate is determined through three channels: import penetration, imported input and export orientation. Labor demand is more sensitive in countries where import penetration is high because currency devaluation increases the prices of imported goods so there is increase in domestic demand. Countries with high export orientation are greatly affected because devaluation increases

the foreign demand of domestic product. Whereas labor demand is less responsive to imported input ratio because in case of devaluation of currency labor demand increases through export is compensate with the decrease in labor demand due to expensive imported input (Kim, 2005). Labor demand is less affected in case of depreciation because cheap exports and expensive imported inputs offset the demand labor. Labor supply is assumed to increase to wages and decrease to income. By setting labor supply equals to labor demand and solve the simultaneous equation, equilibrium employment has been derived.

$$L_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 Y_t^* + (\alpha_{3,0} + \alpha_{3,1}\chi + \alpha_{3,2} M + \alpha_{3,3}\rho) E_t + \alpha_4 R_t + \alpha_5 R^*_t \quad \text{.... eq 1}$$

$$L_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 Y_t^* + \alpha_3, E_t + \alpha_4 E_t \chi + \alpha_5 E_t M + \alpha_6 E_t\rho + \alpha_7 R_t + \alpha_8 R^*_t \quad \text{..... Eq 2}$$

L_t (labor force employed) , Y_t (Income in the home country), Y^*_t(Income of foreign country) , E_t (Real Exchange rate) , X_t (Export Orientation ratio) , M_t (Import penetration ratio) , ρ_t (Imported Input ratio) , R_t (Local interest rate) , R^*_t(World Interest rate)

3.2 Econometric Methodology

When the variables in time series are stationary or non-stationary, then the problem of spurious regression may arise, to avoid this problem, co-integration analysis has been established to check the long run relation among the variables. So, to find out the long run impact of exchange rate on employment ARDL co-integration is used (Pesaran et al. 2001). The main benefit of this methodology is that there is no need to check whether the variables are co-integrated at I (0) or I (1). This approach is to be considered better than Johansen approach when sample size is small. By computing F-statistics, long run relation between variables will be examined (Pesaran et al. 2001). If relation exist in long run than by using ARDL short run or long run coefficients have estimated. The short run parameters show the relation between dependent variable deviation from its long run trend, and independent variable deviation from its long run trend. While estimating

ARDL approach lag length is to be selected by SBC or AIC criterion. The model is presented as follows:

$$\Delta \ln L_t = \alpha_0 + \alpha_1 \ln Y_{t-1} + \alpha_2 \ln Y^*_{t-1} + \alpha_3 \ln E_{t-1} + \alpha_4 E_t \chi_{t-1} + \alpha_5 E_t M_{t-1} + \alpha_6 E_t \rho_{t-1} + \alpha_7 R_{t-1} + \alpha_8 R^*_{t-1} + \alpha_9 \ln L_{t-1} + \Sigma i=1 \ldots\ldots n\ \beta_1 \Delta \ln Y_{t-i} + \Sigma i=1 \ldots\ldots n\ \beta_2 \Delta \ln Y^*_{t-ii} + \Sigma i=1 \ldots\ldots n\ \beta_3 \Delta E_{t-i} + \Sigma i=1 \ldots\ldots n\ \beta_4 \Delta E_t \chi_{t-i} + \Sigma i=1 \ldots\ldots n\ \beta_5 \Delta E_t M_{t-i} + \Sigma i=1 \ldots\ldots n\ \beta_6 \Delta E_t \rho_{t-i} + \Sigma i=1 \ldots\ldots n\ \beta_7 \Delta R_{t-i} + \Sigma i=1 \ldots\ldots n\ \beta_8 \Delta R^*_{t-i} + \Sigma i=1 \ldots\ldots n\ \beta_9 \Delta \ln L_{t-I} + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots \text{eq 3}$$

εt is white noise error term, Δ is first difference, n is maximum lag length to be used, ΣI show correction dynamics, $\alpha 1 \ldots\ldots \alpha 9$ shows long run coefficients, and $\beta 1 \ldots\ldots \beta 9$ shows short run parameters. Now first step is to estimate regression, and then bound (F-test) is performed to estimate long run relation among variables. If the calculated values of F-statistics exceed the upper bound critical value (which assume that the explanatory variables are of order one), the null hypothesis of no co-integration has not been accepted. Similarly, if lower critical value (which assume that the explanatory variables of order zero), exceeds the F-calculated values, then the null hypothesis can be rejected. If the calculated value of F-statistic lies in the middle of upper bound critical value and lower bound critical values the results remains indecisive. Hypothesis for F-test is no co-integration, hypothesis would be accepted or rejected according to the results of test. If long run relation has been established, then ECM can be examined. The coefficient of ECMt-1 shows the speed of adjustment.

3.3 Data description:

In this study yearly data is used from 1990 to 2018 to find out the impact of exchange rate on employment.

3.4 Unit of Analysis:

As the study is being focused on to analyze the impact of exchange rate on employment in Asian countries like Pakistan, India, China and Japan, because purpose of study is to compare the results of countries where exports are dominant with import dependent countries. So these 4 countries (Pakistan, India as import competing and China, Japan as export oriented countries) are chosen to keep the study simple.

3.5 Explanation of variable

Dependent Variable: Labor force (Employment)

In the model Lt denotes the employed labor force. The labor force comprises of all the persons in population who are employed or unemployed. The employed labor force is defined as the workers who are willing to work for payment or profit and working for at least one hour in a week. The employed labor force also included those workers who are not at work temporarily because of illness or any other reason but have a job.

Independent Variables

Income in home Country (GDP home):

In the model Yt denotes the income in home country and defined as GDP of the home country. GDP is defined as the market value of all the goods and services produced during a specified period within the boundary of a country. It is treated as overall measure of domestic production. Country's health and economic growth is measured through GDP. It is to be considered as important determinant of employment.

Income of foreign country (foreign GDP):

Y*t denotes the income in foreign country also define as GDP of foreign country. GDP of US is taken income of foreign country.

Real exchange rate:

Et denotes the real exchange rate in the model. Real exchange rate is different from nominal exchange rate. The real exchange rate is expressed when the effect of inflation is adjusted in nominal exchange rate. The competitiveness of country in foreign market is measured through real exchange rate.

Export Orientation ratio:

Xt denotes the export orientation ratio in the model. It is calculated as (exports/output). It is simply defined as the percentage of domestic output that is exported. Labor demand is also more sensitive to export orientation because in case of devaluation of currency the foreign demand of local product is also increases.

Import Penetration ratio:

Mt denotes imported input ratio. It is calculated as imports/(output- exports *0.1+imports). It is the percentage of local demand that is fulfilled by imports. Labor demand is more sensitive to import penetration because devaluation of currency increases the demand of domestic product.

Imported Input ratio:

ρt denotes the imported input ratio. It is calculated as (imported input/output). It is defined as the percentage of local demand that is accomplished through imported input.

Real interest rate:

Rt denotes real interest rate in the model. Real interest rate is different from nominal interest rate. Real interest rate is expressed when the effects of inflation has been removed from nominal interest rate. Real interest rate depicts actual cost of borrowing to debtors and actual profit to investors

World Interest rate:

R*t denotes the world interest rate in the model. US real interest rate is used for World interest rate.

3.6 Variable description

Variables	Expected Sign	Source
Lt (Labor force, employed)	It is the dependent variable.	ILO
Yt (Income in the home country)	Its sign is dependent on income effect on labor supply and demand.	WDI
Y*t (Income of foreign country)	Its sign anticipated to be positive because increase in foreign income and demand increases the domestic demand.	US GDP is to be used as income of foreign country. Data from WDI
Et (Real exchange rate)	Its expected sign is negative because depreciation of a currency increases the employment level.	IFS
Xt (Export orientation ratio)	Employment elasticity depend on sign size and magnitude of trade ratios for each country, if the positive affect ($\alpha 5$ α 6) dominate the negative effect (α 7), then the effect of devaluation of exchange rate is positive on employment.	Export orientation is calculated as (exports/output). Data from WDI
Mt (Import penetration ratio)	Employment elasticity depend on sign size and magnitude of trade ratios for each country.	Import penetration is calculated as imports/ (output- exports *0.1+imports). Data from WDI
ρt (Imported input ratio)	Employment elasticity depend on sign size and magnitude of trade ratios for each country.	Imported input ratio is calculated as (imported input/output). Data from World Integrated Trade Organisation(WITS)
Rt (Local interest rate)	Its sign is expected to be negative because of increase in local interest rate, investment in country decreases and hence it may reduce employment level	IFS
R*t (World interest rate)	The sign is anticipated to be positive because increase in world interest rate the employment level increases.	World interest rate data is extracted by using US real interest rate.

All variables except interest rates in log form.

Chapter 4

4.1 Empirical Results

This chapter first of all explores the statistical summary of the data uses for this study and explores the long run and short run relation for each country we have used ARDL technique for this purpose.

JAPAN

Summary Statistics

In order to deal with the larger set of observations statistician measure the central tendency or commonly known as the arthematic mean of the data and the spread of the data which is known as standard deviation of data.

Table 4.1 Summary Statistics

Variables	Mean	Standard Deviation
L_t	58182.66941	1371.095013
Y_t	4879448.9	202308.4837
R_t	2.724822849	1.346071718
E_t	94.82383234	17.74113628
ρ_t	0.045223937	0.01899642
M_t	0.092566426	0.036471277
X_t	0.112413016	0.033382045

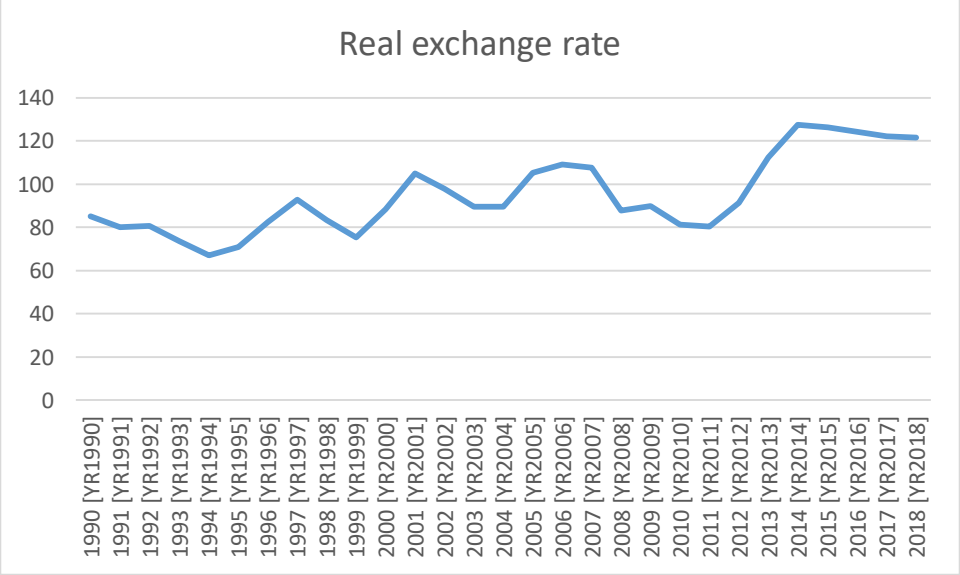
Y^*_t	49605.678	6286.226519
R^*_t	3.783802391	1.97083587

We explore the descriptive statics in table 4.1 in order to describe the distributional characteristics of the variables of the current study. This is the descriptive statics for the sample period of 1990-2018. In the first column average mean of all variables is displayed second column present standard deviation of variables.

Table 4.1 shows that the average value of labor force is 58182 and standard deviation is 1371. We report the average value of GDP home is 4879448 and Standard deviation is 202308. This value reflects that dispersion from mean is approximately 202308. The average rate of interest rate is approximately 2%, while dispersion of value from average is 1%. On average Japan has real exchange rate 94.82 and standard deviation is 17.74. The average value of imported input ratio is 0.045%. The rate of dispersion of imported input ratio from mean is approximately 0.018%. Average value of import penetration ratio is 0.092% and the rate of dispersion is 0.0364%. The average value of export orientation ratio is approximately 0.0112% and the rate of dispersion is 0.033%. On average foreign country income is 49605, and standard deviation is 6286. The average value of world interest rate is 3% and rate of dispersion is approximately 1%.

Fig 4.1

Fig 4.2



To estimate econometric analysis using time series data unit root test should be done prior to check whether the variables are stationary or not. However, in case of ARDL co-integration it is not necessary to check the order of integration. But while performing bound test of Pesaran et al. (2001) it is essential to check order of integration because some of the variables fall in upper bound

some fall in lower bound. So, unit root testing is mandatory in this case. Augmented Dickey Fuller test has been performed to check whether the variables are integrated at I(1) or I(0).

Table 4.2: ADF test (Japan)

Variables	t-adf	AIC
L_t	-1.245	11.58
Y_t	-3.084*	22.99
R_t	-2.099	-0.2966
E_t	-2.444	4.606
ρ_t	-1.440	-8.938
M_t	-1.306	-8.409
X_t	-1.345	-8.294
Y^*_t	-1.455	13.24
R^*_t	-1.830	0.04864

ADF tests (T=22, Constant; 5%=-3.00 1%=-3.77)

Ho: Unit root is present

Table 4.2 show the results of ADF test. The lag length of the variable is selected where AIC is minimum. All the variables are integrated at I(1) except GDP home which is at I(0) no variable is at I(2). The condition to estimate long run and short run model by using ARDL technique has been fulfilled.

The first step is to calculate F-test and compared the statistics with F-critical values from Pesaran et al. (2001). If calculated value is less than lower and upper bounds, then no long run relationship exist. If F-Stat lies between these bounds, then result is indecisive.

Table 4.3: ARDL Bound Testing Analysis (Japan)

ARDL Bound testing Analysis		
Critical values from Pesaran et al. (2001),		
Critical Bound values	**Lower**	**Upper**
1%	1.95	3.06
5%	2.22	3.39
10%	2.79	4.10

Ho: No long run Relationship

Subset F (9,17) = 23.6908 [0.0000]*

Table 4.3 shows that the F calculated value **23.69** is greater than critical values of lower and upper bounds at 5% significance level, which means that long run relation exist between employment and all independent variables (GDP home, Real interest rate, Real exchange rate, imported input, export orientation, import penetration, foreign income, World interest rate). The long run and short run models have been estimated in the next step.

Table 4.4: Regression Analysis (Japan)

	Coefficient	**t-value**	**t-prob**
DLY$_t$	0.232793	4.53	0.0003
LL$_t$ _1	-0.0947724	-0.922	0.3696
LY$_t$_1	0.113591	1.95	0.0681
LE$_t$ _1	-0.0229402	1.67	0.0113
Lρ_t _1	-0.0196556	-0.845	0.0410
LM$_t$ _1	0.0137000	0.508	0.0018

LX_t _1	0.0348169	1.37	0.0189
L Y^*_t _1	0.0707531	-1.33	0.0201
R_t _1	-0.00105903	0.727	0.0477
R^*_t _1	0.000301252	-0.411	0.0686

Table 4.4 shows the significance and sign of coefficients whether they are positively or negatively affecting the employment.

The coefficient of LGDP home is statistically insignificant which means that LGDP home doesn't affect the employment in the long run. The result of this study is supported by many studies of previous literature. According to Thayaparan (2014) employment is not affected by GDP in the long run. Trimurti and Komalasri (2014) also support the same study.

The coefficient of Lreal exchange rate is negatively related with employment and has a significant impact on employment. When real exchange rate increases by 1% then employment decreases by 0.24%. The findings of this study is supported by past studies of Chemnani et al. (2012) that there is a negative relation between exchange rate and employment, currency appreciation decreases the employment level. The coefficients of Limport penetration, Lexport orientation, Limported input and their signs show the employment elasticity. The signs of Limport penetration and Lexport orientation are positive which dominate the negative sign of Limported input which means the effect of devaluation of exchange rate is positive on employment. The positive sign shows the high openness of country. According to kim (2005) high open industries show positive response to exchange rate shock and low open industries show negative response to exchange rate shock. Campa and Goldberg (2001) also support the same theory of trade ratios and openness.

The coefficient of Lfoereign Income is statistically significant and has a positive sign which means 1% increase in foreign income employment increases by 0.74%. As expected by the theory that foreign income increases the employment level by increasing domestic demand and domestic production. The coefficient of real interest rate has a negative sign and statistically significant. When 1% increase in real interest rate decreases the employment by 0.01%. According to Bhorat (2016) there is a negative relation between interest rate and employment this is because of if a central bank increases interest rate to target inflation than this is not in favor of limiting unemployment. There is a tradeoff between increasing employment and controlling inflation.

The coefficient of world interest rate is positive and statistically insignificant which means employment is not affected by world interest rate in the long run.

Long run equation

$\text{Ln}L_{t-1} = 1.1985\ \text{Ln}Y_{t-1} - 0.2420\ \text{Ln}E_{t-1} - 0.2073\ \text{Ln}\rho_{t-1} + 0.1445\ \text{Ln}M_{t-1} + 0.3673\ \text{Ln}X_{t-1} + 0.7465\ \text{Ln}Y^*_{t-1} - 0.01117R_{t-1} + 0.0031\ R^*_{t-1}$

Table 4.5: Short run Analysis (Japan)

	Coefficient	t-value	t-prob
DLY$_t$	0.232793	4.53	0.0003
EC_1	-0.0947724	-0.922	0.0369

The short run analysis shows the result that GDP home positively and significantly affect employment. The coefficient of lagged EC is significant and has a negative sign which confirm convergence towards long run. The value of EC -0.09 shows that 9% deviation from long run reduce within 1 year. The above empirical estimations are only authentic if diagnostic test are clear

means there is no problem of heteroskedasticity, no Arch effects and residuals are normally distributed.

Table 4.6: Diagnostic tests (Japan)

ARCH 1-1 test: F(1,25) = 1.1786 [0.2880]	Ho: No Arch effect in residuals	Do not Reject Ho.
Normality test: Chi^2(2) = 2.6964 [0.2597]	Ho: Residuals are normally distributed.	Do not Reject Ho.
Hetero test: F(20,6) = 2.5257 [0.1271]	Ho: No Hetroskedasticity	Do not Reject Ho.
Hetero-X test: not enough observations		
RESET23 test: F(2,15) = 1.6664 [0.2221]	Ho: Model is stable	Do not Reject Ho.

The p value of Arch test is (0.288) which is greater than (0.05), there is no Arch effect in the residuals. The normality test has p value (0.25) which is greater than (0.05) which means residuals are normally distributed. For heteroscedasticity p value is (0.12) which is greater than (0.05) so there is no problem of hetro. The p value for reset test is (0.21) which is greater than (0.05) which shows that model is stable.

CHINA

Summary Statistics

In order to deal with the larger set of observations statistician measure the central tendency or commonly known as the arthematic mean of the data and the spread of the data which is known as standard deviation of data.

Table 4.7 Summary Statistics

Variables	Mean	Standard Deviation
L_t	602730.5773	69754.31176
Y_t	4034232	3796389
R_t	1.948912394	3.251674667
E_t	7.392747129	0.935110596
ρ_t	0.092850168	0.022696743
M_t	0.16502023	0.032427329
X_t	0.224456133	0.052473048
Y^*_t	49605.678	6286.226519
R^*_t	3.783802391	1.97083587

We explore the descriptive statics in table 4.7 in order to describe the distributional characteristics of the variables of the current study. This is the descriptive statics for the sample period of 1990-2018. In the first column average mean of all variables is displayed second column present standard deviation of variables.

Table 4.7 shows that the average value of labor force is 602730 and standard deviation is 69754. We report the average value of GDP home is 4034232 and Standard deviation is 3796389. The average rate of interest rate is approximately 1%, while dispersion of value from average is 3%.

On average China has real exchange rate 7.39 and standard deviation is 0.93. The average value of imported input ratio is 0.092%. The rate of dispersion of imported input ratio from mean is approximately 0.022%. Average value of import penetration ratio is 0.165% and the rate of dispersion is 0.032%. The average value of export orientation ratio is approximately 0.22% and the rate of dispersion is 0.05%. On average foreign country income is 49605, and standard deviation is 6286. The average value of world interest rate is 3% and rate of dispersion is approximately 1%.

Fig 4.3

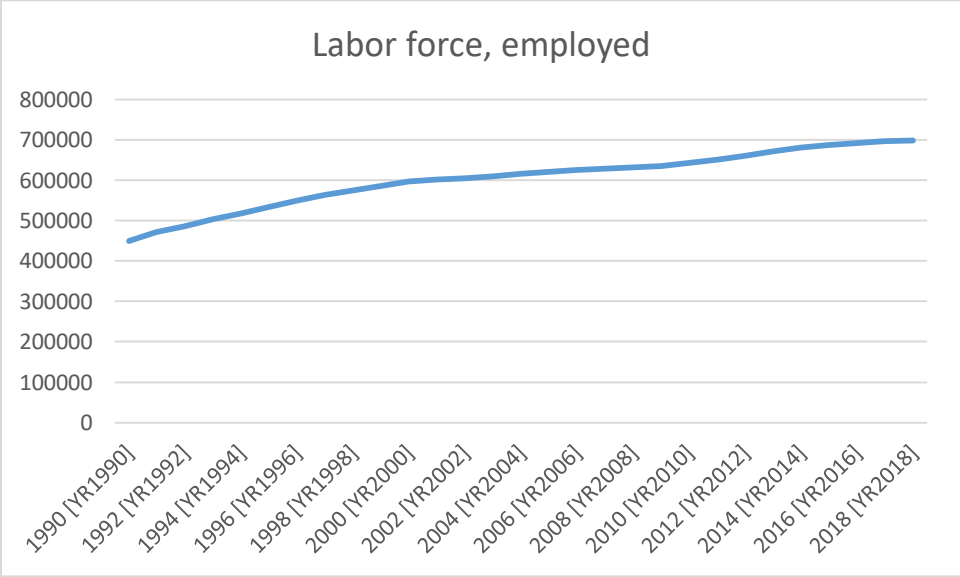
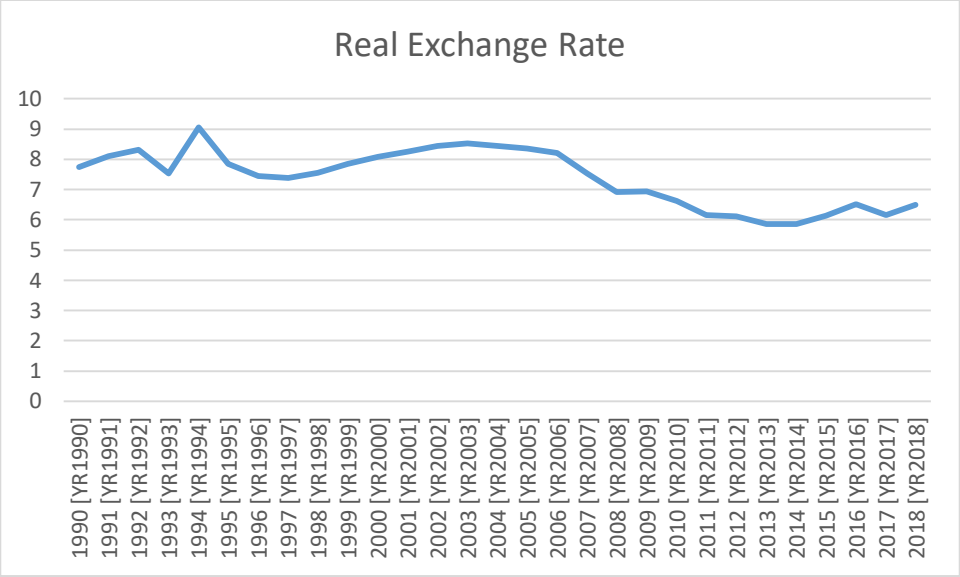


Fig 4.4



To estimate econometric analysis using time series data unit root test should be done prior to check whether the variables are stationary or not. However, in case of ARDL co-integration it is not necessary to check the order of integration. But while performing bound test of Pesaran et al. (2001) it is essential to check order of integration because some of the variables fall in upper bound some fall in lower bound. So, unit root testing is mandatory in this case. Augmented Dickey Fuller test has been performed to check whether the variables are integrated at I(1) or I(0).

Table 4.8: ADF test (China)

Variables	t-adf	AIC
L_t	-4.570**	16.23
Y_t	7.744*	24.22
R_t	-3.589*	24.22
E_t	-1.126	-1.341

ρ_t	-2.450	-8.925
M_t	-1.596	-8.168
X_t	-1.323	-7.367
Y^*_t	-1.141	13.17
R^*_t	-1.830	0.04864

ADF tests (T=25, Constant; 5%=-2.98 1%=-3.72)

Ho: Unit root is present

Table 4.8 show the results of ADF test. The lag length of the variable is selected where AIC is minimum. All the variables are integrated at I(1) except labor force, GDP home, real interest rate which are at I(0) no variable is at I(2). The condition to estimate long run and short run model by using ARDL technique has been fulfilled. The first step is to calculate F-test and compared the statistics with F-critical values from Pesaran et al. (2001). If calculated value is less than lower and upper bounds, then no long run relationship exist. If F-Stat lies between these bounds, then result is indecisive.

Table 4.9: ARDL Bound testing Analysis (China)

ARDL Bound testing Analysis

Critical values from Pesaran et al. (2001),

Critical Bound values	**Lower**	**Upper**
1%	1.95	3.06
5%	2.22	3.39
10%	2.79	4.10

Ho : No long run Relationship

Subset F (9,16) = 64.165 [0.0000]**

Table 4.9 shows that the F calculated value **64.165** is greater than critical values of lower and upper bounds at 5% significance level, which means that long-run relation exist between employment and all independent variables (GDP home, Real interest rate, Real exchange rate, imported input, export orientation, import penetration, foreign income, World interest rate). The long run and short run models have been estimated in the next step.

Table 4.10: Regression Analysis (China)

	Coefficient	t-value	t-prob
Constant	2.76390	5.60	0.0000
DLY_t	0.128886	3.77	0.0017
LL_{t_1}	-0.122734	-2.01	0.0413
LY_{t_1}	0.0212090	3.50	0.1030
$L\rho_{t\_1}$	0.00412608	0.389	0.0025
LX_{t_1}	0.000843571	0.0819	0.0358
LM_{t_1}	0.000934237	0.0801	0.0272
$L\ Y^*_{t\_1}$	0.133640	-3.70	0.0019
LE_{t_1}	-0.133640	0.861	0.0401
R_{t_1}	-0.000610244	2.60	0.0192
$R^*_{t\_1}$	3.18261e-005	-0.0724	0.0943

Table 4.10 shows the significance and sign of coefficients whether they are positively or negatively affect the employment. The coefficient of LGDP home is statistically insignificant which means that LGDP home doesn't affect the employment in the long run. The coefficients of Limport penetration, Lexport orientation, Limported input and their signs show the employment elasticity. The signs of Limport penetration and Lexport orientation Limported Input are positive which means the effect of devaluation of exchange rate is positive on employment. The positive sign show the high openness of country.

The coefficient of Lfoereign Income is statistically significant and has a positive sign which means 1% increase in foreign income employment increases by 1.08%. As expected by the theory that foreign income increases the employment level by increasing domestic demand and domestic production. The coefficient of Lreal exchange rate is negatively related with employment and has a significant impact on employment. When real exchange rate increases by 1% then employment decreases by 0.10%. The coefficient of real interest rate has a negative sign and statistically significant. When 1% increase in real interest rate decreases the employment by 0.004%. The coefficient of world interest rate is positive and statistically insignificant which means employment is not affected by world interest rate in the long run.

Long run Equation

$$\text{Ln}L_{t-1} = 0.1728\ \text{Ln}Y_{t-1} - 0.1072\text{Ln}E_{t-1} + 0.0336\ \text{Ln}\rho_{t-1} + 0.00687\ \text{Ln}X_{t-1} + 1.0888\text{Ln}Y^*_{t-1} + 0.00737\text{Ln}\ M_{t-1} + 0.0049\ R_{t-1} - 2.59\text{E-}04\ R^*_{t-1}$$

Table 4.11: Short Run Analysis (China)

	Coefficient	t-value	t-prob
Constant	2.76390	5.60	0.0000
DLY_t	0.128886	3.77	0.0017
EC_1	-0.122734	-2.01	0.0413

The short run analysis shows the result that GDP home positively and significantly affect employment. The coefficient of lagged EC is significant and has a negative sign which confirm convergence towards long run. The value of EC -0.12 shows that 12% deviation from long run reduce within 1 year. The above empirical estimations are only authentic if diagnostic test are clear means there is no problem of heteroskedasticity, no Arch effects and residuals are normally distributed.

Table 4.12: Diagnostic Tests (China)

ARCH 1-1 test: F(1,25) = 0.61076 [0.4418]	Ho: No Arch effect in residuals	Do not Reject Ho.
Normality test: Chi^2(2) = 2.1548 [0.2461]	Ho: Residuals are normally distributed.	Do not Reject Ho.
Hetero test: F(20,6) = 1.4903 [0.3258]	Ho: No Heteroscedasticity	Do not Reject Ho.
Hetero-X test: not enough observations		
RESET23 test: F(2,14) = 1.0834 [0.3652]	Ho: Model is stable	Do not Reject Ho.

The p value of Arch test is (0.441) which is greater than (0.05), there is no Arch effect in the residuals. The normality test has p value (0.246) which is greater than (0.05) which means residuals are normally distributed. For heteroscedasticity p value is (0.32) which is greater than (0.05) so there is no problem of hetro. The p value for reset test is (0.36) which is greater than (0.05) which shows that model is stable.

PAKISTAN

Summary Statistics

In order to deal with the larger set of observations statistician measure the central tendency or commonly known as the arthematic mean of the data and the spread of the data which is known as standard deviation of data.

Table 4.13 Summary Statistics

Variables	Mean	Standard Deviation
L_t	35573.34641	9635.255837
Y_t	66307.2906	62559.6882
R_t	1.705157738	3.640955991
E_t	88.643407	10.690415
ρ_t	0.40319123	0.186927889
M_t	0.346084735	0.098413863
X_t	0.371433801	0.205304893
Y^*_t	49605.678	49973.19484
R^*_t	3.783802391	1.97083587

We explore the descriptive statics in table 4.13 in order to describe the distributional characteristics of the variables of the current study. This is the descriptive statics for the sample period of 1990-2018. In the first column average mean of all variables is displayed second column present standard deviation of variables.

Table 4.13 shows that the average value of labor force is 35573 and standard deviation is 9635. We report the average value of GDP home is 66307 and Standard deviation is 62559. The average rate of interest rate is approximately 1%, while dispersion of value from average is 3%. On average Pakistan has real exchange rate 10.690 and standard deviation is 10.69. The average value of imported input ratio is 0.40%. The rate of dispersion of imported input ratio from mean is approximately 0.18%. Average value of import penetration ratio is 0.346% and the rate of dispersion is 0.098%. The average value of export orientation ratio is approximately 0.37% and the rate of dispersion is 0.205%. On average foreign country income is 49605, and standard deviation is 49973. The average value of world interest rate is 3% and rate of dispersion is approximately 1%.

Fig 4.5

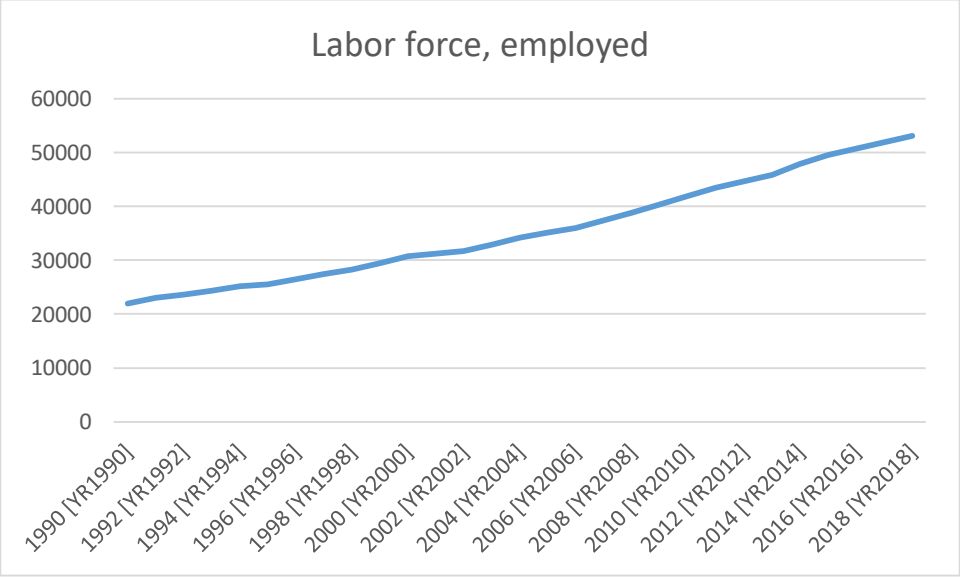
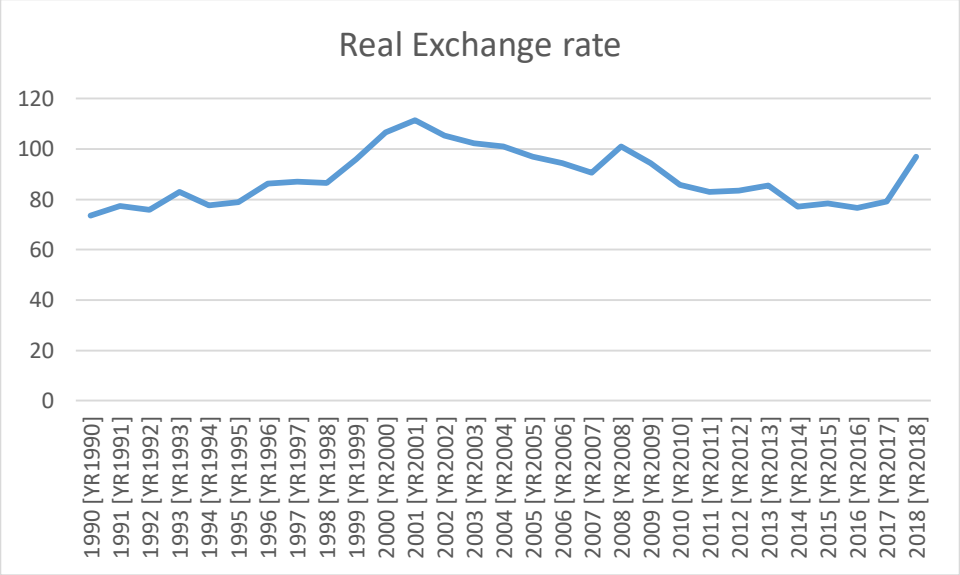


Fig 4.6



To estimate econometric analysis using time series data unit root test should be done prior to check whether the variables are stationary or not. Augmented Dickey Fuller test has been performed to check whether the variables are integrated at I(1) or I(0).

Table 4.14: ADF test (Pakistan)

Variables	t-adf	AIC
L_t	3.324*	11.66
Y_t	1.152	16.30
R_t	-3.390*	2.478
E_t	-1.606	3.769
ρ_t	-3.607*	-5.548
M_t	-1.919	-6.703

X_t	-1.824	-6.858
Y^*_t	-1.141	13.17
R^*_t	-1.830	0.04864

ADF tests (T=25, Constant; 5%=-2.98 1%=-3.72)

Ho: Unit root is present

Table 4.14 show the results of ADF test. The lag length of the variable is selected where AIC is minimum. All the variables are integrated at I(1) except labor force, Imported Input, real interest rate which are at I(0) no variable is at I(2). The condition to estimate long run and short run model by using ARDL technique has been fulfilled.

The first step is to calculate F-test and compared the statistics with F-critical values from Pesaran et al. (2001). If calculated value is less than lower and upper bounds, then no long run relationship exist. If F-Stat lies between these bounds, then result is indecisive.

Table 4.15: ARDL Bound Testing Analysis (Pakistan)

ARDL Bound testing Analysis		
Critical values from Pesaran et al. (2001),		
Critical Bound values	**Lower**	**Upper**
1%	1.95	3.06
5%	2.22	3.39
10%	2.79	4.10

Ho : No long run Relationship

Subset F (10,16) = 42.2723 [0.0000)*

Table 4.15 shows that the F calculated value **42.2723** is greater than critical values of lower and upper bounds at 5% significance level, which means that long run relation exist between employment and all independent variables (GDP home, Real interest rate, Real exchange rate, imported input, export orientation, import penetration, foreign income, World interest rate). The long run and short run models have been estimated in the next step.

Table 4.16: Regression Analysis (Pakistan)

	Coefficient	t-value	t-prob
Constant	2.86896	2.98	0.0088
DLY_t	-0.392574	-3.23	0.0053
LL_t _1	-0.708108	-3.72	0.0019
LY_t_1	0.153690	4.43	0.1904
LE_t _1	-0.0382032	-1.27	0.0220
$L\rho_t$ _1	0.0248983	1.45	0.0166
LM_t _1	-0.0236812	-0.643	0.0529
LX_t _1	-0.000315985	-0.0115	0.04991
L Y^*_t _1	0.292197	2.41	0.0284
R_t _1	-0.00472795	-2.97	0.0091
R^*_t _1	0.00168453	-0.861	0.4022

Table 4.16 shows the significance and sign of coefficients whether they are positively or negatively affect the employment. The coefficient of LGDP home is statistically insignificant which means that LGDP home doesn't affect the employment in the long run. The coefficient of Lreal exchange rate is negatively related with employment and has a significant impact on employment. When real exchange rate increases by 1% then employment decreases by 0.05%.

The coefficients of Limport penetration, Lexport orientation, Limported input and their signs show the employment elasticity. The signs of Limport penetration and Lexport orientation are negative

which dominate the positive sign of Limported input which means the effect of devaluation of exchange rate is negative on employment.

The negative sign shows the low openness of country. The coefficient of Lfoereign Income is statistically significant and has a positive sign which means 1% increase in foreign income employment increases by 0.41%. As expected by the theory that foreign income increases the employment level by increasing domestic demand and domestic production. The coefficient of real interest rate has a negative sign and statistically significant. When 1% increase in real interest rate decreases the employment by 0.006%. The coefficient of world interest rate is positive and statistically insignificant which means employment is not affected by world interest rate in the long run.

Long run equation:

$$\text{Ln}L_{t-1} = 0.2170\text{Ln}Y_{t-1} - 0.0539\ \text{Ln}E_{t-1} + 0.03516\ \text{Ln}\rho_{t-1} - 0.03344\ \text{Ln}M_{t-1} - 0.000446\ \text{Ln}X_{t-1} - 0.4126\text{Ln}Y^*_{t-1} - 0.00667\ R_{t-1} + 0.00237\ R^*_{t-1}$$

Table 4.17: Short Run Analysis (Pakistan)

	Coefficient	t-value	t-prob
Constant	2.86896	2.98	0.0088
DLY$_t$	-0.392574	-3.23	0.0053
EC_1	-0.708108	-3.72	0.0019

The short run analysis shows the result that GDP home positively and significantly affect employment. The coefficient of lagged EC is significant and has a negative sign which confirm convergence towards long run. The value of EC -0.70 shows that 70% deviation from long run reduce within 1 year. The above empirical estimations are only authentic if diagnostic test are clear

means there is no problem of heteroscedasticity, no Arch effects and residuals are normally distributed.

Table 4.18: Diagnostic tests (Pakistan)

ARCH 1-1 test: F(1,25) = 0.41437 [0.6256]	Ho: No Arch effect in residuals	Do not Reject Ho.
Normality test: Chi^2(2) = 1.9380 [0.3795]	Ho: Residuals are normally distributed.	Do not Reject Ho.
Hetero test: F(20,6) = 2.9575 [0.0915]	Ho: No Hetroskedasticity	Do not Reject Ho.
Hetero-X test: not enough observations		
RESET23 test: F(2,14) = 2.3106 [0.1358]	Ho: Model is stable	Do not Reject Ho.

The p value of Arch test is (0.625) which is greater than (0.05), there is no Arch effect in the residuals. The normality test has p value (0.379) which is greater than (0.05) which means residuals are normally distributed. For hetroskedasticity p value is (0.091) which is greater than (0.05) so there is no problem of hetro. The p value for reset test is (0.135) which is greater than (0.05) which shows that model is stable.

INDIA

Summary Statistics

In order to deal with the larger set of observations statistician measure the central tendency or commonly known as the arthematic mean of the data and the spread of the data which is known as standard deviation of data.

Table 4.19 Summary Statistics

Variables	Mean	Standard Deviation
L_t	325487.1474	55578.42744
Y_t	739856.9048	703762.1479
R_t	5.471564978	2.469298653
E_t	57.14108717	7.985294458
ρ_t	0.170103956	0.055552695
M_t	0.201336507	0.047814177
X_t	0.185663273	0.038800445
Y^*_t	49605.678	6286.226519
R^*_t	3.783802391	1.97083587

We explore the descriptive statics in table 4.19 in order to describe the distributional characteristics of the variables of the current study. This is the descriptive statics for the sample period of 1990-2018. In the first column average mean of all variables is displayed second column present standard deviation of variables.

Table 4.19 shows that the average value of labor force is 325487 and standard deviation is 55578. We report the average value of GDP home is 739856 and Standard deviation is 703762. The average rate of interest rate is approximately 5%, while dispersion of value from average is 2%. On average

India has real exchange rate 57.14 and standard deviation is 7.98. The average value of imported input ratio is 0.170%. The rate of dispersion of imported input ratio from mean is approximately 0.05%. Average value of import penetration ratio is 0.201% and the rate of dispersion is 0.04%. The average value of export orientation ratio is approximately 0.18% and the rate of dispersion is 0.038%. On average foreign country income is 49605, and standard deviation is 6286. The average value of world interest rate is 3% and rate of dispersion is approximately 1%.

Fig 4.7

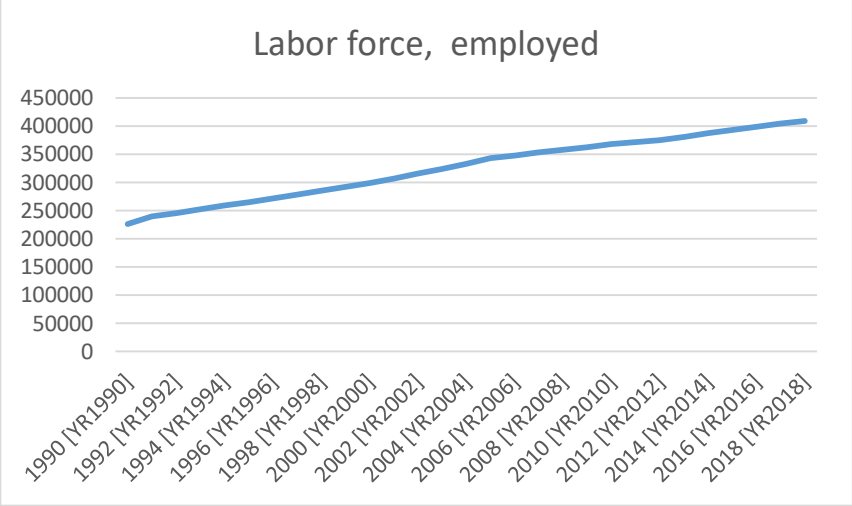
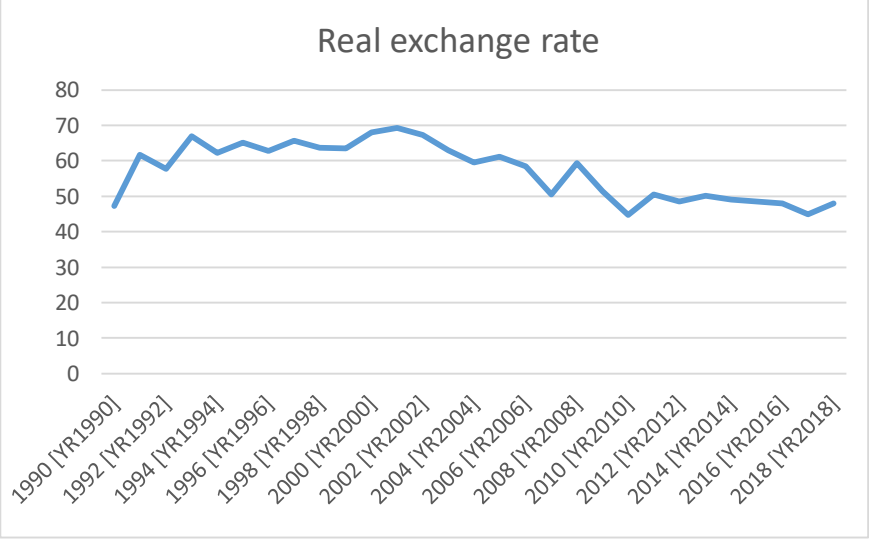


Fig 4.8



To estimate econometric analysis using time series data unit root test should be done prior to check whether the variables are stationary or not. Augmented Dickey Fuller test has been performed to check whether the variables are integrated at I(1) or I(0).

Table 4.20: ADF test (India)

Variables	t-adf	AIC
L_t	-1.479	14.03
Y_t	6.82	20.00
R_t	-2.451	1.554
E_t	-0.5255	2.808
ρ_t	-1.622	-6.812
M_t	-1.383	-7.158
X_t	-2.263	-7.354
R^*_t	-1.280	0.1926
Y^*_t	-1.078	13.29

ADF tests (T=25, Constant; 5%=-2.98 1%=-3.72)

Ho: Unit root is present

Table 4.20 show the results of ADF test. The lag length of the variable is selected where AIC is minimum. All the variables are integrated at I(1) except GDP home which is at I(0) no variable is at I(2). The condition to estimate long run and short run model by using ARDL technique has been fulfilled. The first step is to calculate F-test and compared the statistics with F-critical values from Pesaran et al. (2001). If calculated value is less than lower and upper bounds, then no long run relationship exist. If F-Stat lies between these bounds, then result is indecisive.

Table 4.21: ARDL Bound testing Analysis (India)

ARDL Bound testing Analysis		
Critical values from Pesaran et al. (2001),		
Critical Bound values	**Lower**	**Upper**
1%	1.95	3.06
5%	2.22	3.39
10%	2.79	4.10

Ho : No long run Relationship

Subset F (8,18) = 19.794 [0.0000]**

Table 4.21 shows that the F calculated value **19.794** is greater than critical values of lower and upper bounds at 5% significance level, which means that long run relation exist between employment and all independent variables(GDP home, Real interest rate, Real exchange rate, imported input, export orientation, import penetration, foreign income, World interest rate). The long run and short run models have been estimated in the next step.

Table 4.22: Regression Analysis (India)

	Coefficient	**t-value**	**t-prob**
LL_t _1	-0.0237092	0.4798	0.0281
LY_t_1	0.00407099	0.1610	0.1816
LE_t _1	-0.00891775	0.0353	0.0481
$L\rho_t$ _1	0.00431795	0.0577	0.0176
LM_t _1	-0.0149817	0.0372	0.0444
LX_t _1	-0.000322814	0.0298	0.0000
L Y^*_t _1	0.0298569	0.0460	0.0307
R_t _1	-0.000291432	0.0322	0.0543
R^*_t _1	0.00102549	0.0398	0.2170

Table 4.22 shows the significance and sign of coefficients whether they are positively or negatively affect the employment. The coefficient of LGDP home is statistically insignificant which means that LGDP home doesn't affect the employment in the long run. The coefficient of Lreal exchange rate is negatively related with employment and has a significant impact on employment. When real exchange rate increases by 1% then employment decreases by 0.37%. The coefficients of Limport penetration, Lexport orientation, Limported input and their signs show the employment elasticity. The signs of Limport penetration and Lexport orientation are negative which dominate the positive sign of Limported input which means the effect of devaluation of exchange rate is negative on employment. The negative sign show the low openness of country.

The coefficient of Lfoereign Income is statistically significant and has a positive sign which means 1% increase in foreign income employment increases by 1.25%. As expected by the theory that foreign income increases the employment level by increasing domestic demand and domestic production. The coefficient of real interest rate has a negative sign and statistically significant. When 1% increase in real interest rate decreases the employment by 0.012%. The coefficient of world interest rate is positive and statistically insignificant which means employment is not effected by world interest rate in the long run.

Long run equation:

$$\text{Ln}Lt_{-1} = 0.1717\text{Ln}Y_{t-1} - 0.3761\text{Ln}E_{t-1} + 0.1821\text{Ln}\rho_{t-1} - 0.6318\text{Ln}M_{t-1} - 0.01361\text{Ln}X_{t-1} + 1.2592\ \text{Ln}\ Y^*_{t-1} - 0.01229\ R_{t-1} + 0.0432\ R^*_{t-1}$$

Table 4.23: Short Run Analysis (India)

	Coefficient	t-value	t-prob
EC_1	-0.0237092	0.4798	0.0281

The coefficient of lagged EC is significant and has a negative sign which confirm convergence towards long run. The value of EC -0.02 shows that 2% deviation from long run reduce within 1 year. The above empirical estimations are only authentic if diagnostic test are clear means there is no problem of heteroscedasticity, no Arch effects and residuals are normally distributed.

Table 4.24: Diagnostic tests (India)

ARCH 1-1 test: F(1,25) = 4.4117 [0.4059]	Ho: No Arch effect in residuals	Do not Reject Ho.
Normality test: Chi^2(2) = 3.8262 [0.1476]	Ho: Residuals are normally distributed.	Do not Reject Ho.
Hetero test: F(18,8) = 0.80489 [0.6687]	Ho: No Heteroscedasticity	Do not Reject Ho.
Hetero-X test: not enough observations		
RESET23 test: F(2,16) = 2.7117 [0.0968]	Ho: Model is stable	Do not Reject Ho.

The p value of Arch test is (0.405) which is greater than (0.05), there is no Arch effect in the residuals. The normality test has p value (0.147) which is greater than (0.05) which means residuals are normally distributed. For heteroskedasticity p value is (0.668) which is greater than (0.05) so there is no problem of hetro. The p value for reset test is (0.096) which is greater than (0.05) which shows that model is stable.

Chapter 5

Conclusion and Policy Recommendation:

Conclusion

This study subsidize to the existing literature of influence of exchange rate on employment, the main contribution of this study is to observe the relation using trade ratios at country level data and comparison has been done on the basis of import competing(Pakistan, India) and export oriented countries(Japan, China). We consider time series data for Pakistan, India, China and Japan over the time period of 1990-2018. By using ARDL technique the conclusion from this study is that long run relationship exists between exchange rate and employment. There is a negative relation between exchange rate and employment which is also supported by previous literature. The empirical analysis suggests that all the variables except GDP and world interest rate are significant for all the four countries and these two variables don't affect employment in the long run. The employment elasticity depends upon the sign of trade ratios (Export Orientation and Import Penetration) and Imported input ratio. The results suggest that Export Oriented Countries Japan and China show positive sign of trade ratios which mean the effect of devaluation of exchange rate is positive on employment and this positive sign show high openness of these countries. While the Import oriented countries Pakistan and India show negative sign, so the effect of devaluation is negative on employment and the negative sign indicate low openness of Pakistan and India. The value of lagged EC is negative for all the four countries so convergence from disequilibrium to equilibrium for Japan is 9% China is 12% Pakistan is 70% and India is 2%.

Policy Recommendation

Policy suggestion based on results of this study is that a competitive exchange rate policy is more efficient than fiscal and monetary policy because it contributes more towards employment

promotion. As expansionary monetary policy and government spending also bring inflation in country. Effective exchange rate policy is more reliable than fiscal and monetary policy to achieve macroeconomic goal of improving employment level. Devaluation encourage employment in China and Japan. The country should adapt devaluation policy according to openness of that country. Country with high openness has a positive effect of devaluation on employment while the countries with low openness effect negatively. The clear impact of macro-economy on employment, the effectiveness of any prospective economic stimulus strategy of the government needs to be assessed through its job creation capability, so as to judge the sustainability of economic growth in a country.

References

Ahmed, S., Ara, I., & Hyder, K. (2005). How external shocks and exchange rate depreciations affect Pakistan? Implications for choice of an exchange rate regime.

Alam, S., & Ahmad, Q. M. (2011). Exchange rate volatility and Pakistan's bilateral imports from major sources: An application of ARDL approach. International Journal of Economics and Finance, 3(2), 245-254.

Ay, A., & Ayhan, F. (2016). EMPLOYMENT AND EXCHANGE RATE VOLATILITY RELATIONSHIP: THE TURKISH CASE. Journal of Business Economics and Finance, 5(1), 108-114.

Belke, A., & Gros, D. (2002). Designing EU–US Atlantic monetary relations: exchange rate variability and labour markets. World Economy, 25(6), 789-813.

Bhorat, H., Tian, N., & Ellyne, M. (2014). The real exchange rate and sectoral employment in South Africa. Development Policy Research Unit.

Branson, W. H., & Love, J. (1988). US manufacturing and the real exchange rate. In Misalignment of exchange rates: Effects on trade and industry (pp. 241-276). University of Chicago Press.

Burgess, S. M., & Knetter, M. M. (1998). An international comparison of employment adjustment to exchange rate fluctuations. Review of International Economics, 6(1), 151-163.

Caglayan, M., & Torres, R. I. M. (2011). The effect of the exchange rates on investment in Mexican manufacturing industry. Open Economies Review, 22(4), 669-683.

Campa, J. M., & Goldberg, L. S. (2001). Employment versus wage adjustment and the US dollar. Review of Economics and Statistics, 83(3), 477-489.

Chang, S. C., & Shen, C. H. (2011). The effect of exchange-rate uncertainty on unemployment in three developing Asian countries: evidence from bivariate GARCH approach. Applied Economics Letters, 18(8), 783-788.

Chimnani, H., Bhutto, N. A., Butt, F., Shaikh, S. A., & Devi, W. (2016). Exchange rate and unemployment.

Colantone, I. (2012). Trade openness, real exchange rates and job reallocation: evidence from Belgium. Review of World Economics, 148(4), 669-706.

Faria, J. R., & León-Ledesma, M. A. (2005). Real exchange rate and employment performance in an open economy. Research in Economics, 59(1), 67-80.

Feldmann, H. (2011). The unemployment effect of exchange rate volatility in industrial countries. Economics Letters, 111(3), 268-271.

Filiztekin, A. (2004). Exchange rates and employment in Turkish manufacturing. Faculty of Arts and Social Sciences, Sabanci University, Istanbul.

Galindo, A., Izquierdo, A., & Montero, J. M. (2007). Real exchange rates, dollarization and industrial employment in Latin America. Emerging Markets Review, 8(4), 284-298.

Gourinchas, P. O. (1999). Exchange rates do matter: French job reallocation and exchange rate turbulence, 1984–1992. European Economic Review, 43(7), 1279-1316.

Hatemi-J, A., & Irandoust, M. (2006). The response of industry employment to exchange rate shocks: evidence from panel cointegration. Applied Economics, 38(4), 415-421.

Hua, P. (2007). Real exchange rate and manufacturing employment in China. China Economic Review, 18(3), 335-353.

Huang, H., & Tang, Y. (2016). How Did Exchange Rates Affect Employment in US Cities? Contemporary Economic Policy, 34(4), 678-697.

Huang, H., Pang, K., & Tang, Y. (2014). Effects of exchange rates on employment in Canada. Canadian Public Policy, 40(4), 339-352.

Huizinga, J. (1987, January). An empirical investigation of the long-run behavior of real exchange rates. In Carnegie-Rochester conference series on public policy (Vol. 27, pp. 149-214). North-Holland.

Jaffri, A. A., Amreen, H., Asjed, R., & Sana, M. Impact of Real Effective Exchange Rate on Unemployment in Pakistan: An Empirical Investigation.

Kılıçaslan, N. (2007). The effect of real exchange rate on unemployment in Turkey (Doctoral dissertation, Bilkent University).

Kim, W. (2005). Analyses of the relationship between exchange rates and employment in Korea. Journal of Economic Development, 30(2), 131.

Klein, M. W., Schuh, S., & Triest, R. K. (2003). Job creation, job destruction, and the real exchange rate. Journal of International Economics, 59(2), 239-265.

Macedoni, L., & Sdogati, F. (2013). Exchange Rate Devaluation and Reshuffling of Global Jobs. Journal of Economic Integration, 241-268.

Mpofu, T. R. (2015). Exchange rate volatility, employment and macroeconomic dynamics in South Africa (Doctoral dissertation, University of Cape Town).

Nucci, F., & Pozzolo, A. F. (2010). The exchange rate, employment and hours: What firm-level data say. Journal of International Economics, 82(2), 112-123.

Nyahokwe, O., & Ncwadi, R. (2013). lmpact of Exchange Rate Volatility on Unemployment in South Africa. Mediterranean Journal of Social Sciences, 4(3), 109-109.

Ottosen, G. K., & Thompson, D. N. (1996). *Reducing unemployment: A case for government deregulation*. Praeger Publishers.

Pattichis*, C., Cheong, C., Mehari, T., & Williams, L. V. (2004). Exchange rate uncertainty, UK trade and the euro. Applied Financial Economics, 14(12), 885-893.

Peláez S, J. T., & Sierra S, L. P. (2016). Does industrial employment react to movements in the real exchange rate? An empirical analysis for colombia, 2000-2010. Latin american journal of economics, 53(1), 39-60

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. Journal of applied econometrics, 16(3), 289-326.

Revenga, A. L. (1992). Exporting jobs? The impact of import competition on employment and wages in US manufacturing. The Quarterly Journal of Economics, 107(1), 255-284.

Trimurti, C. P., & Komalasari, Y. (2014). Determinants of unemployment: Empirical evidences from 7 Province in Indonesia. Scientific Research Journal (SCIRJ), 2(8), 5-9.

Yokoyama, I., Higa, K., & Kawaguchi, D. (2015). The effect of exchange rate fluctuations on employment in a segmented labor market. Research Institute of Economy, Trade and Industry (RIETI).

Zeng, X., Yuxue, C., Shisong, Q., & Yumei, Y. (2011). Real exchange rate, foreign trade and employment: Evidence from China.